

What is claimed is:

- 5 1. A method for activating a fuse comprising:
 providing an integrated circuit chip, said
integrated circuit chip comprising an integrated
circuit chip active surface, said integrated circuit
chip active surface being formed on a first surface of
10 a substrate, said substrate having a substrate backside
surface, said substrate backside surface being opposite
said substrate first surface, said substrate having a
substrate band-gap energy;
 forming a fuse in said integrated circuit chip
15 active surface, said fuse being activated by LASER
energy, said LASER energy being comprised of photons,
each photon having a predetermined photon energy, said
photon energy being less than said substrate band-gap
energy;
20 activating said fuse in said integrated circuit
chip active surface by directing said LASER at said
substrate backside surface and focusing said LASER
energy such that an intensity of said LASER energy at
said fuse causes multiple-photon absorption by said
25 fuse.
2. The method for activating a fuse of Claim 1,
wherein;
 said activating said fuse in said integrated
30 circuit chip active surface by directing said LASER at
said substrate backside surface and focusing said LASER
energy such that an intensity of said LASER energy at
said fuse causes multiple-photon absorption by said
fuse and causes said fuse to be annealed.
- 35 3. The method for activating a fuse of Claim 2,
wherein;

said predetermined photon energy is less than said substrate band-gap energy but greater than one-half said substrate band-gap energy.

5 4. The method for activating a fuse of Claim 2,
wherein;
 said predetermined photon energy is less than one-
half said substrate band-gap energy but greater than
one-third said substrate band-gap energy.

10 5. The method for activating a fuse of Claim 2,
wherein;
 said predetermined photon energy is less than said
substrate band-gap energy divided by "n-1" but greater
15 than said substrate band-gap energy divided by "n",
where "n" is the number of photons that must be nearly
simultaneously absorbed by said fuse to anneal said
fuse and where "n" is an integer equal to or larger
than two.

20 6. The method for activating a fuse of Claim 2,
wherein;
 said fuse electrically couples a repair circuit to
said integrated circuit.

25 7. The method for activating a fuse of Claim 2,
wherein;
 said fuse electrically bypasses a defective
circuit in said integrated circuit.

30 8. The method for activating a fuse of Claim 1,
wherein;
 said activating said fuse in said integrated
circuit chip active surface by directing said LASER at
35 said substrate backside surface and focusing said LASER

energy such that an intensity of said LASER energy at said fuse causes multiple-photon absorption by said fuse and causes said fuse to be ablated.

5 9. The method for activating a fuse of Claim 8, wherein;
 said predetermined photon energy is less than said substrate band-gap energy but greater than one-half said substrate band-gap energy.

10 10. The method for activating a fuse of Claim 8, wherein;
 said predetermined photon energy is less than half said substrate band-gap energy but greater than one-
15 third said substrate band-gap energy.

 11. The method for activating a fuse of Claim 8, wherein;
 said predetermined photon energy is less than said
20 substrate band-gap energy divided by "n-1" but greater than said substrate band-gap energy divided by "n", where "n" is the number of photons that must be nearly simultaneously absorbed by said fuse to ablate said fuse and where "n" is an integer equal to or larger
25 than two.

 12. The method for activating a fuse of Claim 8, wherein;
 said fuse electrically couples a repair circuit to
30 said integrated circuit.

 13. The method for activating a fuse of Claim 8, wherein;
 said fuse electrically bypasses a defective
35 circuit in said integrated circuit.

14. A method for repairing a non-functioning integrated circuit comprising:

providing an integrated circuit chip, said
5 integrated circuit chip comprising an integrated
circuit chip active surface, said integrated circuit
chip active surface being formed on a first surface of
a substrate, said substrate having a substrate backside
surface, said substrate backside surface being opposite
10 said substrate first surface, said substrate having a
substrate band-gap energy;

providing redundant repair circuitry in said
integrated circuit chip active surface to replace any
failed circuitry in said integrated circuit chip active
15 surface;

forming a fuse in said integrated circuit chip
active surface, said fuse for connecting said redundant
repair circuitry to circuitry formed in said integrated
circuit active surface, said fuse being activated by
20 LASER energy, said LASER energy being comprised of
photons, each photon having a predetermined photon
energy, said photon energy being less than said
substrate band-gap energy;

activating said fuse in said integrated circuit
25 chip active surface by directing said LASER at said
substrate backside surface and focusing said LASER
energy such that an intensity of said LASER energy at
said fuse causes multiple-photon absorption by said
fuse, said fuse thereby connecting said redundant
30 repair circuitry to said circuitry formed in said
integrated circuit active surface.

15. The method for repairing a non-functioning integrated circuit of Claim 14, wherein;

35 said activating said fuse in said integrated
circuit chip active surface by directing said LASER at

said substrate backside surface and focusing said LASER energy such that an intensity of said LASER energy at said fuse causes multiple-photon absorption by said fuse and causes said fuse to be annealed.

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16. The method for repairing a non-functioning integrated circuit of Claim 15, wherein;

said predetermined photon energy is less than said substrate band-gap energy but greater than one-half
10 said substrate band-gap energy.

17. The method for repairing a non-functioning integrated circuit of Claim 15, wherein;

said predetermined photon energy is less than half
15 said substrate band-gap energy but greater than one-third said substrate band-gap energy.

18. The method for repairing a non-functioning integrated circuit of Claim 15, wherein;

20. said predetermined photon energy is less than said substrate band-gap energy divided by "n-1" but greater than said substrate band-gap energy divided by "n", where "n" is the number of photons that must be nearly simultaneously absorbed by said fuse to anneal said
25 fuse and where "n" is an integer equal to or larger than two.

19. The method for repairing a non-functioning integrated circuit of Claim 15, wherein;

30 said fuse electrically couples a repair circuit to said integrated circuit.

20. The method for repairing a non-functioning integrated circuit of Claim 15, wherein;

said fuse electrically bypasses a defective circuit in said integrated circuit.

21. The method for repairing a non-functioning
5 integrated circuit of Claim 14, wherein;
said activating said fuse in said integrated
circuit chip active surface by directing said LASER at
said substrate backside surface and focusing said LASER
energy such that an intensity of said LASER energy at
10 said fuse causes multiple-photon absorption by said
fuse and causes said fuse to be ablated.

22. The method for repairing a non-functioning
integrated circuit of Claim 21, wherein;
15 said predetermined photon energy is less than said
substrate band-gap energy but greater than one-half
said substrate band-gap energy.

23. The method for repairing a non-functioning
20 integrated circuit of Claim 21, wherein;
said predetermined photon energy is less than half
said substrate band-gap energy but greater than one-
third said substrate band-gap energy.

24. The method for repairing a non-functioning
25 integrated circuit of Claim 21, wherein;
said predetermined photon energy is less than said
substrate band-gap energy divided by "n-1" but greater
than said substrate band-gap energy divided by "n",
30 where "n" is the number of photons that must be nearly
simultaneously absorbed by said fuse to ablate said
fuse and where "n" is an integer equal to or larger
than two.

25. The method for repairing a non-functioning
35 integrated circuit of Claim 21, wherein;

said fuse electrically couples a repair circuit to said integrated circuit.

26. The method for repairing a non-functioning
5 integrated circuit of Claim 21, wherein;
said fuse electrically bypasses a defective circuit in said integrated circuit.

27. A method for activating a fuse comprising:
10 providing an integrated circuit chip, said
integrated circuit chip comprising an integrated
circuit chip active surface, said integrated circuit
chip active surface being formed on a first surface of
a substrate, said substrate having a substrate backside
15 surface, said substrate backside surface being opposite
said substrate first surface, said substrate having a
substrate band-gap energy;

forming a fuse in said integrated circuit chip
active surface, said fuse being activated by LASER
20 energy, said LASER energy being comprised of photons,
each photon having a predetermined photon energy, said
photon energy being less than said substrate band-gap
energy;

activating said fuse in said integrated circuit
25 chip active surface by directing said LASER at said a
surface and focusing said LASER energy such that an
intensity of said LASER energy at said fuse causes
multiple-photon absorption by said fuse.

30 28. The method for activating a fuse of Claim 27,
wherein;

said activating said fuse in said integrated
circuit chip active surface by directing said LASER at
said surface and focusing said LASER energy such that
35 an intensity of said LASER energy at said fuse causes

multiple-photon absorption by said fuse and causes said fuse to be annealed.

29. The method for activating a fuse of Claim 28,
5 wherein;
said predetermined photon energy is less than said substrate band-gap energy but greater than one-half said substrate band-gap energy.

10 30. The method for activating a fuse of Claim 28, wherein;
said predetermined photon energy is less than half said substrate band-gap energy but greater than one-third said substrate band-gap energy.

15 31. The method for activating a fuse of Claim 28, wherein;
said predetermined photon energy is less than said substrate band-gap energy divided by "n-1" but greater
20 than said substrate band-gap energy divided by "n", where "n" is the number of photons that must be nearly simultaneously absorbed by said fuse to anneal said fuse and where "n" is an integer equal to or larger than two.

25 32. The method for activating a fuse of Claim 28, wherein;
said fuse electrically couples a repair circuit to said integrated circuit.

30 33. The method for activating a fuse of Claim 28, wherein;
said fuse electrically bypasses a defective circuit in said integrated circuit.

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34. The method for activating a fuse of Claim 28,
wherein;

said activating said fuse in said integrated
circuit chip active surface by directing said LASER at
5 said substrate backside surface and focusing said LASER
energy such that an intensity of said LASER energy at
said fuse causes multiple-photon absorption by said
fuse and causes said fuse to be ablated.

10 35. The method for activating a fuse of Claim 34,
wherein;

said predetermined photon energy is less than said
substrate band-gap energy but greater than one-half
said substrate band-gap energy.

15 36. The method for activating a fuse of Claim 34,
wherein;

said predetermined photon energy is less than half
said substrate band-gap energy but greater than one-
20 third said substrate band-gap energy.

37. The method for activating a fuse of Claim 34,
wherein;

said predetermined photon energy is less than said
25 substrate band-gap energy divided by "n-1" but greater
than said substrate band-gap energy divided by "n",
where "n" is the number of photons that must be nearly
simultaneously absorbed by said fuse to ablate said
fuse and where "n" is an integer equal to or larger
30 than two.

38. The method for activating a fuse of Claim 34,
wherein;

said fuse electrically couples a repair circuit to
35 said integrated circuit.

39. The method for activating a fuse of Claim 34,
wherein;
said fuse electrically bypasses a defective circuit in
said integrated circuit.

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